Operation Manual for the 746 ISIC Monochromator.

This document assumes that the 746 instrument has been set up and aligned to point at a light source, and that all cables and power cords have been correctly connected. Directions are for a configuration using the Si (silicon) detector. {PbS (lead sulfide) detector related directions are included in brackets.}

Power up and configure system components --

Power to Controller (model 740-1C/D) ON.
Power to Lock-in Radiometer (model 736) ON.
{If using PbS detector, turn PbS temperature regulator ON}
Power to controlling PC ON.
Set DETECTOR TYPE switch (on 736) to 1 {set to 2 for PbS detector}.

Adjust wavelength drive and readout to reflect actual grating position --

Set 746 monochromator wavelength drive to MANUAL (use small knob on side of 746).
Use wavelength manual drive (large turning knob on side of 746) to set wavelength to 400 nm (refer to analog wavelength display on 746).
Set 746 monochromator wavelength drive to MOTOR (small knob on side of 746).
Press PRESET button on.
Raise grating knob (on top of 746), turn to G-05-1200 grating setting.
{For PbS detector, turn grating knob to G-16-600 setting.}
Press grating knob down, making sure that grating has seated correctly.

Check and adjust zero for autorange feature --

Set CHOPPER switch (736) to OFF.
Set FILTER WHEEL switch (740-1C/D) to MANUAL.
Press and hold filter wheel INCREMENT button till filter number 9 is displayed (display is above increment button).
Set response time switch (736) to FAST.
Set range switch (736) to AUTO ("-11" {-4 for PbS} is displayed on LED above range switch).
Set range switch to MANUAL.
Turn METER ZERO knob till signal display reads ".000 -11" {-4 for PbS}.
Push UP button once (display will read –10).
Turn METER ZERO knob till signal display reads ".000 -10" {-3 for PbS}.
Continue through ranges -9, -8, and –7, {-2, -1 for PbS} adjusting each signal to ".000".
Set range switch to AUTO.

Allow at least 30 minutes warm-up time for 740-1C/D and 736.

Find and record correct phase angle (while source is warming up) –

Press FAST, FORWARD, and ON buttons (740-1C/D, wavelength drive buttons).
Press STOP when the wavelength LED readout reads 1600.0 (use SLOW, FORWARD, REVERSE, and STOP buttons to adjust).
Switch Chopper (736) ON; allow 10 seconds for chopper to come up to speed.
Set PHASE ANGLE switches (736) to MANUAL and 180°.

Turn PHASE ANGLE knob till LED phase angle readout displays 320° {360° for PbS detector}.
Set FILTER WHEEL switch to MANUAL.
Push INCREMENT button until LED filter display shows "3" {4 for PbS detector}.
Set RANGE switch to AUTO, then back to MANUAL (wait a few seconds for system to automatically set gain).
Turn "0°-360°" knob (736) counterclockwise till signal readout on 736 is close to .000 (make sure number is positive).
Note DEGREES display.
Turn "0°-360°" knob clockwise + 90° from present degree readout.
{Note: with PbS detector, it may be necessary to switch PHASE ANGLE 0/180 switch to 0°, should the nominal degree setting for the chopper turn out to be greater than 360 degrees.}
Record degrees, signal, and gain.

Re-adjust phase angle during source warm-up, and record drift of phase angle / signal.

Start control program –

Set RANGE switch to AUTO.
Set FILTER WHEEL switch to COMPUTER.
Double-click 746.BAT on PC (this batch file runs GRAPHICS and 746SIG-C.EXE).

Set grating cut-on wavelength for grating 2 –

Press [F3] function key (on PC) to get grating screen.
Press [F3] to select grating to modify.
Type 2 [enter] to select grating 2.
For blaze: type 1.60 [enter] (this is nominal wavelength for grating, in micrometers).
For grooves: type 600 [enter] (this is grooves per inch for grating).
For cut-on: type 1111 [enter] {use 800 for PbS detector} (this is the cut-on wavelength in nm).
[F10] to exit grating screen.
[F5] to store grating properties.
[F10] to continue with program.

Enter scan control data –

The program will request an upper and lower bound to be entered.
For Si detector, type 380,1100 [enter]. {For PbS type 900,2500.}
For the wavelength interval, type 10 [enter] {20 for PbS}.
Enter the date in yymmdd format and press [enter] (to use the default date which is usually correct, press [enter]).
Press [enter] (no printer output).
Check items on screen checklist, then press the spacebar.
Enter the lab temperature, in C.
Enter the relative humidity (e.g. 58% would be typed as 58 [enter]).
Enter the slit size (pressing [enter] will default to 2.5mm slits).
Press [enter] for a default minimum sample of 5 per wavelength.
Press [enter] for a maximum sample rate of 20 per wavelength.

Press [F1] if using the Si detector. {[F2] for PbS}
Press a function key to choose the noise threshold (usually [F4] for .5%).
Type in the run designation (e.g. if scanning Hardy, user might type 16 lamps Hardy [enter]). Do not type commas.
Type an appropriate filename (usually syymmdda [enter] where s is an alphanumeric representing the source, yymmdd is the date, and a is an alphanumeric representing the chronological order of the scan).
Press the spacebar to start the scan.
{If using PbS, the program will prompt for a grating change at 1600 nm. When prompted, raise the grating knob and turn it to the G-20-300 setting, then push it down until it seats solidly.}

After scan is completed –

Press [F3] to save the *.avg file.
Adjust and record the phase angle at the end of each scan. (See directions under *Find and record correct phase angle* above.)
Press [F5] if another scan is desired, or press [F10] to end the program.